evidence obtained in a cellular model of LQTS that we recently developed, we hypothesized that the augmented sodium inward current which is a consequence of the SCN5A gene defect in LQT3, would increase QT adaptation to fast rates. We tested this hypothesis in 16 genotyped LQTS patients and in 18 controls. QT interval adaptation in response to heart rate changes was derived from exercise stress test or, in children who could not perform the exercise stress test, from Holter recordings. QT was measured during stable heart rate (RR change < 10% for > 10 beats) For each 100 ms decrement of RR, QT interval shortened in controls by 2.8% ± 1.3%, in LQT1 by 4.4% ± 2.2%. in LQT2 by 3.9% ± 1.9% and in LQT3 patients by 9.5% ± 3% (ANOVA $p < 0.0001$; LQT3 vs LQT1, LQT2 and controls $p < 0.05$ Scheffe post hoc). These findings demonstrate differential response to heart rate changes among the three genetic variants of LQTS and suggest that LQT3 patients while presenting a marked prolongation of QT at slow rates are able to shorten QT interval at faster rates. LQT3 patients are more likely than other LQTS pts to benefit from cardiac pacing that can prevent low heart rates and the attendant excessive QT prolongation.

2:15

756-2 Diurnal and Heart Rate Dynamics of QT Interval in Symptomatic and Asymptomatic Affected Family Members of Long QT Syndrome

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Ambulatory electrocardiography was performed in 34 symptomatic (S, mean QT_c 501 ms) and 35 asymptomatic but affected (As, mean QT_c 485 ms) long QT syndrome (LQTS) family members, and in 22 controls. QT intervals (QT, to the end of T-wave) were measured at heart rates from 50 by steps of 10 to 110/min in each hour where available. QT in all day-time samples representing a specified heart rate were averaged for individuals, and linear regression of QT and heart rate (HR) was determined for each group. Furthermore, QT in all samples at heart rate 60 bpm were averaged for day (10 am–8 pm) and night (00 am–05 am) periods.

The QT/HR slope was −2.35 (ms/min^{-1}; $r = 0.99$) for symptomatic and −2.38 ($r = 0.98$) for asymptomatic members and −1.81 ($r = 0.99$) for controls, with respective intercepts at 640, 640 and 531 ms. No statistically significant difference existed in QT/HR slopes between S and As (multiple regression test). QT lengthened during night in each group (all $p < 0.05$). QT were similar in S and As in day time, but significantly longer in S than in As during night (table):

	S	As	Control	p (S vs. As)
QT day	501 ± 36	485 ± 30	421 ± 16	NS
QT night	531 ± 42	498 ± 31	441 ± 16	0.003

QT interval behavior in multiple heart-rate based samples in ambulatory ECG may be unable to separate symptomatic from asymptomatic but affected LQTS relatives. In contrast, the symptomatic members are characterized by a greater circadian variation with more marked QT interval lengthening at night.

2:30

756-3 Dynamic Relation Between Ventricular Repolarization and Heart Rate in the Long QT Syndrome

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In long QT syndrome (LQTS) the dynamic relation between the early portion of QT interval (QTp) and heart rate was previously reported to be impaired. However, QTp may not correspond to the entire QT interval (QTe), also including the terminal portion more likely to be affected in LQTS. We analyzed the relation between QTp and QTe and cycle length (RR) in the 24-hour Holter recordings of 32 LQTS patients (56% females, mean age 21 ± 15 years, 75% with history of syncope/cardiac arrest, 56% on beta-blockers, BB) and of 32 normal subjects (C) with similar gender and age distribution. A new algorithm (ELA Medical) automatically measured QTp and QTe from 2880 30-sec templates and computed the rate corrected QTe and QTp (QTec, QTpc, ms) and linear regression slopes (QTp/RR and QTe/RR):

	RR	QTec	QTpc	QTe/RR	QTp/RR
Controls (n = 32)	809 ± 126	408 ± 20	313 ± 19	0.15 ± 0.04	0.18 ± 0.04
Pts w/out BB (n = 14)	801 ± 114	499 ± 30	405 ± 32	0.31 ± 0.15	0.28 ± 0.12
Pts with BB (n = 18)	949 ± 125	493 ± 32	392 ± 32	0.24 ± 0.10	0.21 ± 0.09

QTe/RR and QTp/RR were steeper in LQTS pts than in C ($p < 0.0001$). LQTS pts without BB tended to have steeper slopes than pts on BB ($p = 0.06$). QTp/RR was steeper than QTe/RR ($p < 0.0001$) in C, while in LQTS pts with BB the reverse was true ($p < 0.01$). Thus both QTp/RR and QTe/RR may help to characterize the altered adaptation of QT interval to heart rate in LQTS. Slopes were more disperse in LQTS pts than in C ($p < 0.0001$), suggesting possible heterogeneity of the dynamic relation of QT interval and heart rate in patients with different risk factors and genetic background.

2:45

756-4 Age and Gender-Related Differences in the Congenital Long QT Syndrome: Findings From the International Prospective Study

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In the long QT syndrome (LQTS) international prospective study an unexplained gender imbalance was consistently observed. Females (F) were prevalent (70%, $p < 0.0001$) among 428 index cases (Probands, P). Among their 4118 family members (FM), F were prevalent in the 256 FM with history of syncope/cardiac arrest (60%, $p = 0.03$) and in the 200 FM with unexplained sudden death before age 50 yrs (59%, $p = 0.06$). However, among P the age-adjusted probability of events (syncope/cardiac arrest/unexplained sudden death) by Kaplan-Meyer survival analysis using birth as time of origin was 71% in M and 44% in F by age 15 yrs ($p = 0.025$), while it was similar in M and F by age 50 yrs (95% vs 90%, ns). By Cox proportional models, the risk of events was higher in M (hazard ratio 1.45; C.I. 1.12–1.85; $p < 0.005$), and particularly in M before age 15 yrs (1.91; 1.43–2.54; $p < 0.0001$), while F were at risk of events after age 15 yrs (1.67; 0.92–3.03; $p = 0.055$). QTc duration (1.02 per 10 ms increments; 1.01–1.04; $p = 0.025$) and deafness (1.74; 1.10–2.75; $p = 0.025$) were independent risk factors in both genders. Similarly, in FM risk factors were first degree relation to P (2.04; 1.55–2.67; $p < 0.001$), deafness (3.17; 1.01–9.91; $p = 0.04$), QTc duration (1.13; 1.101–1.15; $p < 0.0001$) and F gender after age 15 yrs (2.41; 1.47–3.95; $p < 0.005$). These findings suggest that in long QT syndrome males have a higher risk of events until puberty, while females remain at risk of events later in life.

3:00

756-5 QT Dispersion During Acute Myocardial Infarction: Correlation With Malignant Ventricular Arrhythmias

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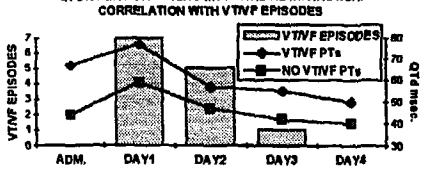
The aim of the study was to evaluate the correlation between the degree of QT dispersion (QTd) and ventricular tachycardia (VT) or fibrillation (VF) in patients (Pts) with acute myocardial infarction (AMI) and particularly to verify the potential correlation between QTd and the onset of VT/VF. For this purpose we evaluated 97 PTs, 78 male and 19 female, with mean age 63 ± 10, admitted consecutively to the CCU because of AMI. 44/97 Pts (45.3%) were treated with fibrinolythic therapy. In every PT we estimated through a computerized system (HP M1700A) the duration of the QT interval in each of the 12 standard leads of the surface ECG. The value of QTd was estimated by subtracting the lowest value of QT from the highest. In order to avoid miscalculation due to artefacts or low amplitude T waves, we estimated the value of QTd by analyzing ten leads excluding the highest and lowest value of 12 leads and those values with a T wave less than 0.15 mvolt. QTd was calculated daily for the first 4 days. We excluded from the study PTs with arrhythmias, or large QRS complex at the ECG or contemporary therapy with drugs that can change the QT and PTs over 80 years in age. *Results:* 13/97 PTs (13%) had VT/VF during AMI (group 1) and 84 PTs (86%) did not have VT/VF (group 2). The average value of QTd in groups 1 and 2 respectively was: admission 67 ms vs. 43 ms ($p < 0.0001$), 1st day 76 ms vs. 59 ms ($p < 0.01$), 2nd day 56 ms vs. 49 ms (p = ns), 3rd day 59 ms vs. 44 ms ($P < 0.5$) 4th day 52 ms vs 42 ms ($P < 0.5$). No significant difference in Qtc duration was observed between the two groups of PTs. The correlation between the occurrences of the arrhythmia episodes and QTd is shown in the figure.



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